Chapter VI

Solid Waste Management

Overview

The market for municipal and industrial solid waste management equipment and services is one of the least developed environmental market segments in Mexico. Although the country generates over 80,000 metric tons of municipal waste each day, only about 83 percent of this waste is collected and only half of the solid waste receives proper handling, confinement, or treatment. Inadequate solid waste treatment is due to lack of infrastructure and low levels of recycling. Few households and industries recycle. Only an estimated 6 percent of the total volume of municipal waste is recaptured daily, despite the estimated recycling potential of close to 30 percent. In addition, industrial solid waste is treated together with municipal solid waste.[1]

Improper solid waste management is a universal problem in Mexico, affecting air, water, and soil. When landfills are not designed properly, pollutants often leak into the groundwater. Landfill gases and fires release toxic fumes and greenhouse gases into the atmosphere. Access to landfills is often not carefully controlled, resulting in the dumping of hazardous waste. With the expansion of the economy, population, and urban areas, many municipal landfills have reached capacity, particularly over the last several decades. A growing industrial sector and higher incomes for consumers have increased the per capita solid waste generation figures. Local governments often lack the financial resources and technical expertise to develop modern solid waste management systems.

The Border Region

Table 1 shows how much waste was generated in 1997 in the three major border cities in Baja California, according to data from the National Environmental Institute (Instituto Nacional de Ecología–INE).

Table 1: Waste Generated Per Capita in Baja California Border Cities[2]

City	Population	Waste generated (tons/year)	Waste generated per capita in 1997 (kg/inhab./day)
Ensenada	314,241	127,085	1.1080
Mexicali	720,945	178,202	0.6772
Tijuana	903,867	342,448	1.0380
Total	1,939,053	647,735	

Mexican border cities and private companies have been moving forward to implement local initiatives to better manage solid waste. The region presents very promising recycling market opportunities due to its proximity to the United States. *Maquiladoras* are often excellent candidates for industrial recycling initiatives. One of these initiatives, the Border Waste Wi$e Project, began in 1997 as a collaborative effort between the cities of San Diego and Tijuana, with support from the EPA and other institutions. It offered on-site technical assistance and training in solid waste management to manufacturers. Company audits identified recyclable solid waste and markets for those materials, enabling many companies to reduce costs and improve profits. Solid waste recycling for industry offers potential business opportunities.

Government Policies and Regulations[3]

The current Mexican administration, under the leadership of Vicente Fox Quesada, has actively promoted the more controlled use of natural resources and is attempting to halt air, water, and soil contamination. The Department for the Integral Management of Pollutants (Dirección General de Manejo Integral de Contaminantes), an entity within the INE, has developed a strategic plan that

clearly defines government objectives and plans. The main objectives outlined in this plan are:

- To minimize the production of waste and adequately manage accumulated waste
- To prevent and control soil, water, and air contamination by industrial and municipal solid waste
- To reduce environmental risks caused by toxic materials

To achieve these objectives, the INE has developed numerous campaigns and projects. One of the top priorities is the development of new government policies to address the problem. The current environmental law, the General Law for Ecological Balance and Environmental Protection (Ley General del Equilibrio Ecológico y la Protección al Ambiente–LGEEPA), which includes legislation related to solid waste, dates back to 1988. A national information campaign has also been developed to encourage the population to use natural resources, such as water and soil, more sparingly and to recycle and reduce waste.

Governmental and Nongovernmental Projects in the Border Region

The city of Tijuana recently upgraded its garbage collection system by purchasing 55 new garbage trucks. The state of Baja California is also constructing two landfills in Tecate and Ensenada that were scheduled to operate by mid-2002. The city of Tecate currently has a loan from NADBank to construct a new sanitary landfill that will move forward once the necessary land is acquired. Plans are also underway for the construction of five other landfills in Tijuana, Rosarito, Mexicali, San Felipe, and in the San Quintín region. Most of these projects are eligible for financing through NADBank since they are located in the border region.[4]

The NADBank, BANOBRAS, and the municipality of Mexicali are cofinancing a project in Mexicali to improve municipal solid waste infrastructure. Plans are underway to construct a new landfill and to upgrade the garbage collection systems, but the project is still awaiting certification by the Border

Environment Cooperation Commission (BECC).[5] NADBank also developed two new solid waste-related programs last year, the Solid Waste Project Development Program (SWPD) and the Solid Waste Environmental Program (SWEP).

The NADBank provides direct grants to border communities through the SWPD program to help with the planning and design of municipal solid waste projects. These projects are then submitted to the BECC for certification are then eligible for NADBank financing (either through NADBank's loan and guarantee program or through SWEP). The grants may be used for the development of master plans, for environmental assessments, topographical studies, and so forth. Single communities may receive up to US$200,000, while regional projects involving two or more communities are eligible for up to US$300,000. Up to 50 percent of the project cost must be matched by the project sponsors.[6]

The NADBank offers a combination of grants and loans through SWEP, for border communities for the improvement of municipal solid waste infrastructure. Only projects certified by the BECC and sponsored by public entities are eligible. Funds cannot be used for the planning or design of projects. Direct grants, concessional loans, or transition assistance (to help ease the transition to new or higher user fees due to increasing debt) are available. Funds can be used for construction and equipment costs, for construction management, and so on. Rather than being limited to financing the construction of landfills, they may also be used to upgrade municipal garbage collection systems or to close existing landfills. Up to US$500,000 is available for single communities and regional projects involving two or more communities can receive up to US$1.5 million. SWEP funds can only finance up to 50 percent of the project and the project sponsor must finance the rest.[7]

SEMARNAT has also developed a nationwide program called *México Limpio* (Clean Mexico), which includes Tijuana. This program actually incorporates a variety of smaller programs aimed at encouraging waste prevention, waste recycling, the rehabilitation of contaminated sites, and

facilitating appropriate management and/or treatment of wastes (both solid and hazardous).[8]

Best Market Prospects

The border region offers opportunities in the area of solid waste management for California companies. There are numerous public and private waste management projects being planned or implemented that provide investment and sales opportunities. With rapid population and industrial growth in the region, the demand for waste management equipment and services is growing. The region is also close to the United States, facilitating transfer of technologies and expertise. In general, solid waste management is one of Mexico's most difficult environmental market segments to break into. As in many cities in the United States, solid waste projects are generally hampered by a poor rate of cost recovery and the municipalities' lack of resources to fully address waste management issues. However, some Mexican municipalities are beginning to consider use of private capital and operator for municipal landfills.

Important projects include the construction of a number of landfills and the acquisition of at least 55 garbage trucks by the municipality of Tijuana. U.S. firms specializing in landfill design and construction as well as equipment providers should have especially good possibilities. Another opportunity might be in the area of recovery of landfill gases for power generation. Such a system is currently operating at the Miramar landfill in San Diego, and its operator, the Environmental Services Department of the city of San Diego, is also converting trash handling trucks to use compressed landfill gases. A list of products needed for the upgrade of the solid waste collection system can be found in Annex A.

References

[1] Sancho y Cervera, Jaime, and Gustavo Rosiles Castro. 2000. "Situación actual del manejo integral de los residuos sólidos en México." México, D.F.: Fundación ICA.
[2] Instituto Nacional de Ecología (INE). 2001 "Misión de la dirección general de manejo integral de contaminantes." (Cited 20 March 2002), http://www.ine.gob.mx.
[3] INE 2001

[4] International Trade Administration, U.S. Department of Commerce. 2001. "Tijuana Upgrades Garbage Collection System." *International Market Insight Reports.* Washington, D.C.: International Trade Administration, U.S. Department of Commerce. And International Trade Administration, U.S. Department of Commerce. 2001. "Landfills for Ensenada and Tecate in Baja California Norte." *International Market Insight Reports.* Washington, D.C.: International Trade Administration, U.S. Department of Commerce

[5] Banco Nacional de Obras y Servicios Públicos, S.N.C. (BANOBRAS). 2002. "Delegación estatal de Baja California. Proyectos ambientales." Reply to survey sent out by IRSC staff. San Diego, California (April).

[6] North American Development Bank (NADBank). 2002a. "Solid Waste Development Program." (Cited 17 April), http://www.nadbank.org/english/program_service/SWPD/swpd_main.htm.

[7] North American Development Bank (NADBank). 2002b. "Solid Waste Environmental Program." (Cited 17 April), http://www.nadbank.org/english/program_service/swep/swep_main.htm.

[8] Lara Moreno, Talpa Dolores. 2002. Inteview with IRSC staff. SEMARNAT, Delegación de Baja California, Mexicali, Baja California, Mexico (March).

Annex A

Best Sales Prospects

- Fifty rear-loading garbage collection trucks with a capacity of 20 cubic yards (preferable brands for the trucks' chassis: Freightliner, International, Kenworth, Ford, and GMC)
- Diesel engines in the following brands: Cummins, Detroit S-60, Caterpillar with a minimum 250 HP, rear axles of 22,000 lbs., front axle of 12,000 lbs., standard transmission with 9–10 speeds (Fuller Eaton)
- Garbage compactors: Leach and/or Pakmor
- Two front loading trucks with 35 cubic yard capacity (preferable brands for chassis: Freightliner, Kenworth, and Peterbilt)
- Diesel engines in the following brands: Cummins, Detroit S-60, Caterpillar with a minimum 300 HP, rear axles of 44,000 lbs., front axle of 18,000 lbs., standard transmission with 9–10 speeds (Fuller Eaton)
- Garbage compactors: Edge and/or Amrep
- Three roll-off garbage trucks for containers of 20 and 35 cubic yards (preferable chassis brands: Freightliner, Kenworth, Peterbilt, and/or International)
- Diesel engines in the following brands: Cummins, Detroit S-60 and/or Caterpillar of 350 HP or more, rear axles of 40,000 lbs., front axle of 12,000 lbs., standard transmission with 9–10 speeds (Fuller Eaton)
- Garbage compactors: Edge and/or Amrep